Dell PowerEdge M I/O Aggregator

For Dell M1000e Blade Enclosures

Simplify network management and increase server bandwidth with the PowerEdge™ M I/O Aggregator, enabling easy plug-and-play data center convergence.

The Dell PowerEdge M I/O Aggregator is an extremely flexible and easy to deploy 1/10GbE aggregation device. Its simplified network management and configuration enable instant plug-and-play connectivity to Dell and multi-vendor networks. In addition, the M I/O Aggregator extends the consolidation benefits of virtualization by replacing multiple GbE NICs, mezzanine cards and switches with fewer, higher bandwidth 10GbE NICs and I/O modules per blade chassis.

Converge with confidence

The Dell PowerEdge M I/O Aggregator is part of Dell Active System framework, a simple, complete and flexible integrated framework for convergence. The M I/O Aggregator blade is a component of the Dell Active System 800, a pre-integrated converged infrastructure solution. Dell's pre-engineered and pre-assembled converged solutions offer outstanding agility and efficiency for data center optimization.

Maximize your bandwidth

Take advantage of 10GbE capability to meet the bandwidth demands of multi-core CPUs and to build your server capacity without overprovisioning your data center. With support for 10GbE in the PowerEdge M I/O Aggregator and support for 10GbE NICs in the server, your network can utilize the additional bandwidth of each individual server. This helps provide support for the growing number of virtual machines (VMs) per physical server.

Efficient installation and easy expandability

With no-fuss installation and simple network integration, the Dell PowerEdge M I/O Aggregator is ready to work right out of the box. The M I/O Aggregator comes install-ready with all ports active, enabling quick integration without concern for license upgrades. It can connect to 16 or 32 blade servers internally via SNAs or mezzanine cards located in the servers. IT administrators can start with the base model's standard 40 10GbE ports (32 internal + eight external), then expand their network with the addition of up to two optional FlexIO modules. Choose from 2-port QSFP+, 4-port SFP+, 4-port 10GBaseT or 4-port FC FlexIO modules. The M I/O Aggregator provides the flexibility to mix and match the FlexIO module types.

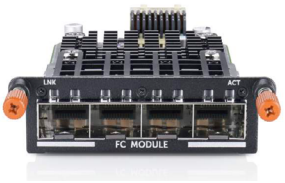
Flexible connectivity for maximum versatility

Optimize your IT schedule and create a nimble and flexible data center with an aggregator that offers simple deployment and plug-and-play connectivity. The Dell PowerEdge M I/O Aggregator blade offers low- to no-touch deployment with exceptional flexibility. Its simplified network management and configuration enable instant plug-and-play connectivity to Dell and multi-vendor networks.

Built-in convergence capabilities

The PowerEdge M I/O Aggregator is fully IEEE data center bridging (DCB) compliant, supporting iSCSI, NAS and FCoE transit. With the optional FC FlexIO module, the M I/O Aggregator is transformed into an NPIV Proxy Gateway capable of bridging Ethernet and Fibre Channel. Converged networking lowers costs by immediately reducing infrastructure requirements for blade servers and interconnects. In addition to infrastructure savings, convergence reduces complexity, simplifies management and increases efficiency in data center operations.

The Dell PowerEdge M I/O Aggregator enables instant plug-and-play connectivity to multi-vendor networks.

	4-port FC module	4-port SFP+ module	4-port 10GBASE-T module	2-port QSFP+ module
Model				
Module differentiator	Designed to deliver four ports of 8Gb Fibre Channel bandwidth (NPG mode only). NPIV Proxy Gateway* (NPG) offering gateway capabilities to existing SAN fabrics.	Provides 4 ports of SFP+ 10Gb connectivity. Supports optical and DAC cable media.	Provides 4 ports of 10GBASE-T connectivity. Supports copper media over relatively longer distance. Maximum of one 10GBASE-T module per IOA (other module bay can be populated).	Provides 2 ports of QSFP+ connectivity. The ports are fixed in breakout mode, providing up to 8 ports of 10Gb Ethernet while only using 2 cables.
Port speed	2/4/8/Gb	10/1Gb	100Mb/1Gb/10Gb (supports auto negotiation)	10Gb
Protocol support	Native Fibre Channel	Ethernet	Ethernet	Ethernet
Media types	2/4/8Gb FC SFP+ Optics	Optical Tranceivers SFP+ 10Gb: SR, LR SFP 1GbE: SX, LX SFP to RJ45 converter 10000Base-T (only capable of 1Gbps) SFP+ Direct Attach Cable (Twinax)	RJ45/Cat6a Copper	QSFP+ to 4xSFP+ Breakout Cables 5m Passive Copper QSFP+ to QSFP+ Direct Attach 1m and 5m, Passive Copper Optical Transceivers SFP+ 40Gb: SR only QSFP+ to QSFP+ Fiber Cables QSFP+ to 4xSFP+ Fiber Breakout Cables Note: the QSFP+ ports on the IOA can connect to a QSFP+ port on a switch as long as the QSFP+ port on the port is in breakout mode.

*The Dell FC FlexIO module uses NPIV Proxy Gateway (NPG) technology, which provides the capability to use converged FCoE inside the M1000e chassis while maintaining traditional unconverged Ethernet and native Fibre Channel outside of the M1000e. With the FC FlexIO module, the IOA provides bridging capabilities between Ethernet and Fibre Channel via FCoE. The IOA manages the following items when the FC FlexIO module is installed:

1. DCB (PFC, ETS and DCBx)
2. FIP discovery and initialization
3. FLOGI and FDISC conversion process
4. FIP keep alives

For communication outside the chassis, the IOA directs all Ethernet traffic out the external Ethernet ports (these ports can be in DCB or non-DCB mode) and convert all FCoE packets to native FC packets and directs them out the native Fibre Channel ports of the FC FlexIO module(s). The IOA acts as an NPG connecting the converged network adapters (CNAs) in the servers to the external Fibre Channel fabric. When the FC FlexIO module is installed, the IOA appears as an FCF to the CNAs while the FC FlexIO ports appear as NPIV N_ports (i.e. HBA ports) to the external Fibre Channel Fabric.

Note: The IOA NPIV Proxy Gateway does not currently provide fabric services.

Specifications: Dell PowerEdge M I/O Aggregator

Port attributes
Up to 32 line-rate 10GbE KR ports
2 line-rate fixed QSFP+ ports (in 4x 10GbE breakout mode)
2 optional FlexIO modules with flexible media choices:
- 2-port QSFP+ module (in 4x 10GbE breakout mode)
- 4-port SFP+ 10GbE module
- 4-port 10GBASE-T 10GbE copper module
(1/10Gb, only one 10GBASE-T module is supported per IOA)

Native 40GbE when IOA is in Manual Mode
1 USB (Type A) port for storage
1 USB (Type A) port for console/management

Performance
MAC addresses: 128K
IPv4 routes: 16K
Switch fabric capacity: 1.28Tbps (full-duplex)
Forwarding capacity: 960Mpps
Link aggregation: Up to 16 members per group, 128 LAG groups
Queues per port: 4 queues
VLANs: 4094
Line-rate Layer 2 switching: All protocols, including IPv4
Packet buffer memory: 9MB
CPU memory: 2GB

Stacking
Stacked units: Up to 6 IOAs (using fixed 40GbE ports only and deployed via CLI)
Stacking bandwidth: Up to 160Gbps (using 1x 40GbE ring)
Stacking topology: Ring and daisy chain
Virtual Link Trunking (VLT): mVLT and L2 over VLT (deployed via CLI)

IEEE compliance
802.1AB LLDP
802.1p L2 Prioritization
802.3ab Gigabit Ethernet (1000Base-T)
802.3ad Link Aggregation with LACP
802.3ae 10GbE (10GBase-X)
802.3ba 40GbE (40GBase-SR4, 40GBase-CR4) on optical ports
802.3u Fast Ethernet (100Base-TX)
802.3x Flow Control
802.3z Gigabit Ethernet (1000Base-X)
ANSI/TIA-1057 LLDP-MED
MTU 12KB

VLAN
802.1Q VLAN Tagging
802.3ac Frame Extensions for VLAN Tagging
Native VLAN

Data center bridging
IEEE 802.1Qbb Priority-Based Flow Contrl (PFC)
IEEE 802.1Qaz Enhanced Transmission Selection (ETS)
Data Center Bridging eXchange (DCBx)
DCBx Application TLV (iSCSI, FCoE)

Fiber channel
NPIV Proxy Gateway (NPG)
Fiber Channel port types : N
Bridging to FC SAN
1 FCoE_Maps per IOM
FCoE features
Native FCoE forwarding
FCoE Initialization Protocol (FIP) v1
FCoE Transit (FIP Snooping Bridge)
FCoE to FC Forwarding
Dynamic FCoE to FC Load Balancing

Security options
854 Telnet
959 FTP
1350 TFTP
2856 RADIUS
3164 Syslog
4254 SSHv2
TACACS+

General IPv4 protocols
768 UDP
791 IPv4
792 ICMP
793 TCP
826 ARP
1042 Ethernet Transmission
1305 NTPv3
1519 CIDR
2131 DHCP (client)
3021 31-bit Prefixes
3128 Tiny Fragment Attack Protection

General IPv6 protocols
4861 IPv6 Host for management port

Multicast
4541 IGMPv1/v2 Snooping

Network management
1155 SMIv1
1156 Internet MIB
1157 SNMPv1
1212 Concise MIB Definitions
1493 Bridges MIB
1901 Community-based SNMPv2
2011 IP MIB
2012 TCP MIB
2013 UDP MIB
2571 Management Frameworks
2572 Message Processing and Dispatching
2576 Coexistence Between SNMPv1/v2
2578 SMIv2
2579 Textual Conventions for SMIv2
2580 Conformance Statements for SMIv2
2665 Ethernet-like Interfaces MIB
2863 Interfaces MIB
3416 SNMPv2
3418 SNMP MIB
4133 Entity MIB
ANSI/TIA-1057 LLDP-MED MIB
IEEE 802.1AB LLDP MIB
IEEE 802.1AB LLDP DOT1 MIB
IEEE 802.1AB LLDP DOT3 MIB
FORCE10-IF-EXTENSION-MIB
FORCE10-LINKAGG-MIB
FORCE10-COPY-CONFIG-MIB
FORCE10-PRODUCTS-MIB
FORCE10-MS-CHASSIS-MIB
FORCE10-SMI
FORCE10-SYSTEM-COMPONEN-MIB
FORCE10-TC-MIB
FORCE10-FIPSNOOPING-MIB
FORCE10-DCB-MIB
LLDP-EXT-DOT1-DCBX-MIB
IEEE8021-PFC-MIB
DELLI_ITA.REV_1_1.MIB

Chassis
Single-wide I/O module for M1000e blade enclosure

Environmental
Power supply: 100–240V AC 50/60 Hz
Max. thermal output: 955.36 BTU/h
Max. current draw per system: 2A at 100/120V AC, 1A at 200/240V AC
Max. power consumption: 123 Watts
ISO 7779 A-weighted sound pressure level: 59.6 dBA at 73.4°F (23°C)
Operating temperature: 32° to 104°F (0° to 40°C)
Operating humidity: 10 to 85% (RH), non-condensing
Max. non-operating specifications:
- Storage temperature: –40° to 158°F (–40° to 70°C)
- Storage humidity: 5 to 95% (RH), non-condensing

Regulatory and environment compliance
UL/CSA 60950-1, Second Edition
EN 60950-1, Second Edition
IEC 60950-1, Second Edition Including all National Deviations and Group Differences
EN 60825-1 Safety of Laser Products Part 1: Equipment Classification Requirements and User's Guide Optical Fibre Communication Systems
FDA Regulation 21 CFR 1040.10 and 1040.11
Emissions
Australia/New Zealand: AS/NZS CISPR 22: 2006, Class A
Canada: ICES-003, Issue-4, Class A
Europe: EN 55022: 2006+A1:2007 (CISPR 22: 2006), Class A
Japan: VCCI V3/2009 Class A
USA: FCC CFR 47 Part 15, Subpart B:2009, Class A
EN 300 386 V1.4.1:2008 EMC for Network Equipment
EN 55024: 1998 + A1: 2001 + A2: 2003
EN 61000-3-2: Harmonic Current Emissions
EN 61000-3-3: Voltage Fluctuations and Flicker
EN 61000-4-2: ESD
EN 61000-4-3: Radiated Immunity
EN 61000-4-4: EFT
EN 61000-4-5: Surge
EN 61000-4-6: Low Frequency Conducted Immunity
All components are RoHS compliant

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